



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of)
William Hein, et al.)
App. Number: 10/688,584)
Filed: 10/17/2003)
For: Microwave Drier)

Date: September 6, 2005
Group Art Number: 3742
Examiner: Philip Leung

APPELLANTS' REPLY BRIEF

This Reply Brief is in response to the Examiner's Answer filed in the above matter and mailed April 20, 2006. The Examiner's Answer includes ten numbered sections (1) through (10) and includes a Conclusion. There does not appear to be any arguments with regard to sections (1) through (7) of Examiner's Answer. In section (8) the Examiner reasserts that Chauffoureaux (US 4,003,554) is evidence relied upon to reject claims 1 and 2 of the application. Appellants continue to assert that Chauffoureaux is not relevant prior art in this case.

(9) Grounds for Rejection

Appellants reassert all of the arguments submitted in the Appellants' Brief, but will not reiterate them here.

Appellants, however, object to the drawing labeled Fig. 2 (from Chauffoureaux) in the Examiner's Answer. The Examiner has labeled Piston Ram Drive 17 as "reciprocating ram." There is absolutely nothing in the patent to indicate what a piston ram drive might be. There is also absolutely nothing in the patent which would allow the inference that a piston ram drive is a reciprocating ram. Appellants do not admit that the piston named in Chauffoureaux may be a ram, but even if it were a ram, a reciprocating ram would not be appropriate for an extruder. The device in Chauffoureaux is an extruder. Essentially, it is a device to heat plastic (a polymer) and push it through a die "...to produce hollow or solid shaped articles of any cross-section whatsoever." (Col. 4, Lines 47 and 48)

The Examiner labels element 5 which is a hopper (Col. 5, Line 45) as a loading section. Chauffoureaux (Col. 2, Lines 60-64) indicates that "This feed system can advantageously be provided with conventional heating means for the purpose of starting to heat the polar polymers

from this stage of their treatment onwards.” Appellants submit that this provision teaches away from a loading section such as that in the instant invention, because there is no provision for preheating in the instant invention.

The Examiner also labels the line connecting the M.W. Generator as a waveguide. This appears to be contrary to the description of the invention which indicates that “The tubular component acting as a waveguide is preferably rectilinear and of constant circular cross-section. It comprises of a tube made from a material which conducts electricity, and preferably from metal.” (Co. 2, Lines 42-44) In addition, the polar polymer is described as being “...forced by the screw 4 through the waveguide tubular component. As it travels through the waveguide, the material is heated by the microwave emitted by the generator 2...” (Col. 5, Lines 46-48) This is a further significant difference between the instant invention and the invention disclosed in Chauffoureaux.

As will be known to persons knowledgeable in the art, there are a variety of types of microwave “applicators.” Two of the most common are Traveling Wave Applicators and Multi-mode Applicators. The device disclosed in Chauffoureaux is a Traveling Wave Applicator and the instant invention is a Multi-mode Applicator. In a Traveling Wave Applicator the source (microwave transmitter) is specifically matched to the load (polar polymer) which as certain dielectric properties and a particular TE_{11} traveling wave is produced. If any other material were introduced into the Chauffoureaux device, the device would have to be redesigned to produce a different traveling wave. With a Multi-mode Applicator the applicator sustains a number of modes within the frequency range of the magnetron. Therefore, it is not nearly as critical to match the source to the load. The size of the applicator is sufficient to allow many different modes to exist within the applicator. That is, while devices such as that disclosed in Chauffoureaux require that the source and the load be specifically matched; the instant invention can process several different types of material without any need to redesign the device. Appellants assert that this is a further indication that an inventor would not have considered Chauffoureaux as appropriate prior art for a starting point for inventing the dryer of the instant invention.

Appellants also disagree with the Examiner labeling elements 13, 15, and 16 as an “unloading section” and “unloading means” which is the equivalent of the unloading section of

the instant invention. As previously mentioned, the device in Chauffoureaux is an extruder and not a heater or dryer. The material in the device is pushed through a die 12 to create a particular shape (Col. 5, Line 51). Figure 2 shows a second tubular component with a malaxating screw 15 which provides "the pressure energy necessary for the final shaping of the material by means of the profiling head." (Col. 5, Lines 60-65) Element 16 is a die or profiling head. (Col. 5, Line 57) Appellants assert that elements 15 and 16 can't properly be considered as an unloading section in any manner similar to that of the instant invention. It is inconceivable to Appellants that someone, even someone knowledgeable in the field, would look with foresight and not with hindsight at the profiling head of Chauffoureaux and come up with the unloading section of the instant invention. Their purpose and function could scarcely be more different.

As to claims 3-6, 8 and 9 which Examiner rejected as being unpatentable over Chauffoureaux and Wear et al. as applied to claims 1 and 2 above, and further in view of Gerling et al.; Appellants reassert without reiterating their arguments set forth in their Brief. Appellants assert one additional argument against combining Chauffoureaux with any of the cited prior art. Chauffoureaux actually teaches away from such a combination.

It is extremely rare for there to be any type of explicit statement in any prior art which specifically teaches toward a combination of prior art. It may be less rare to find such a statement which teaches away from such a combination. However, Appellants assert that Chauffoureaux actually does contain such statements. At Col. 1, Lines 46-62 Chauffoureaux indicates that a device which is similar to the instant invention is inappropriate for the intended purpose of Chauffoureaux. "Microwaves have never been exploited either for processing polymers in equipment specially designed for this purpose," because it "...results in preferential heating of the hot points and, taking into account the low thermal conductivity of these materials, rapidly leads to degradation, especially when the material is heat-sensitive."

At Col. 5, Lines 65-68 and Col. 3, Lines 1 and 2, Chauffoureaux indicates that "In order to avoid heterogeneous and consequently defective heating of the polar polymer as it travels through the tubular component, the material is malaxated by means of a fixed mechanical system which does not disturb the electromagnetic field associated with the microwave." The malaxating device is "...a thin elongated partition which divides the tubular component

diametrically into two separate channels...” having “...the shape of a helicoidal surface...” (Col. 3, Lines 5-10)

The basic purpose of Chauffoureaux is to provide a method or device for overcoming the problems related to the use of a device which may be somewhat similar to the instant invention for the purpose of extruding polar polymers. Chauffoureaux specifically states that a device which might be considered a combination of Chauffoureaux with Wear and Gerling (Appellants don't concede that it is) would not work for the purpose of Chauffoureaux. Appellants submit that this is a direct and specific statement teaching away from such a combination.

(10) Response to Argument

The Examiner indicates at page 7 that “...Chauffoureaux clearly shows a microwave heating device including substantially all the claimed features except for the use of a plurality of microwave guides.” Without reiterating them, Appellants reassert all their previous arguments with this statement of the Examiner.

The Examiner further indicates that Appellants' claim that Chauffoureaux is inappropriate prior art “...is not well taken.” The Examiner goes on at page 7 in an attempt to show that Chauffoureaux clearly can perform the same drying function as the instant invention. Appellants respectfully disagree with both of these assumptions.

Section 103 provides in part that “...the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” This is, of course, pretty subjective and difficult for Examiners and others to apply in many particular cases. This section is amplified somewhat by the cases cited in Appellants' Brief such “...that section 103 rejections must be determined by looking at the problem from the point of view of the inventor at the time of the invention and may not be based upon hindsight with the invention reconstructed based upon the a blueprint supplied by the applicant's claims.” That is, it is not sufficient for an Examiner to comb through all of the prior art and find all of the elements of an invention. (Appellants don't concede that all of the elements have been found.) Appellants submit that a person looking at the problem from the point of view of the inventor and not using hindsight would not even consider the invention disclosed in Chauffoureaux when looking for solutions to drying using microwaves.

The Chauffoureaux device simply isn't a dryer. It's an extruder. The Chauffoureaux invention is intended to heat and mix polymers and push them through a die to create a variety of solid, extruded shapes. Appellants have found absolutely no reference in Chauffoureaux to the disclosed device doing any drying. Appellants further respectfully submit that the Examiner's contention at page 7 that "...any heating also inherently causes a drying function of the material..." is incorrect. It seems quite likely, for instance, that heating a polar polymer in the Chauffoureaux device doesn't produce any drying at all. There may be softening, mixing, and possibly liquification; but no drying. Appellants submit that Chauffoureaux is not appropriate prior art in this instance which would be based upon a blueprint supplied by the applicant's claims. In order to dry material, there must be some ability to remove moisture from the treated material. In order to remove moisture, there must be some "air space" around the material from which moisture may be removed. Because the Chauffoureaux device is an extruder and must fill the "treatment section" in order to operate, there can be no air space and Chauffoureaux can not be used as a dryer without significant modification in design and basic operating principle.

The Examiner asserts that the "piston ram drive 17" referenced in Chauffoureaux is a reciprocating piston which is the same as the reciprocating piston of the instant invention. The Examiner bases this assertion, at least in part, upon the idea that the sentence in Chauffoureaux (Col. 5, Lines 53 and 54) that the device in Figure 2 is similar to Figure 1 "...except that instead of a screw drive, a piston ram drive 17 is provided for driving position 24..." actually contains a typographical error and should read "driving piston 24." Appellants don't speculate as what a driving position might be, but assert that a number of very interested parties looked at the Chauffoureaux application a number of times: the inventor, at least one patent attorney, an examiner, and an assistant examiner. It seems that, if the patent was meant to say piston rather than position, it would say that. Piston and position actually aren't very close in spelling. At any rate, Appellants assert that if a patent is to be used as prior art to reject the claims of an invention, the reference should be a lot more clear than is found in Chauffoureaux.

The Examiner goes on to say that the elongated structure of Figure 2 "...strongly suggests that it is a piston..." To Appellants it strongly suggests that it is a screw of some type. The actual drawing of Figures 1 and 2 are about the same. It appears that the slanted lines labeled element 4 (screw) are intended to represent a screw. The same slanted lines are found in the same position

in Figure 2. This looks a lot more like a screw than a piston. Perhaps the piston ram drive is simply another method of driving the screw.

Appellants reassert but will not reiterate the previous arguments relating to the unloading section and unloading means.

On page 8 of the Examiner's Answer, the Examiner indicates that "Chauffoureaux uses 'waveguides' to describe 'the processing zone 1'" and further indicates that "...any zone that carries microwave energy can be considered as a waveguide as is well known in the art of microwave heating devices." The Examiner indicates that the treatment section of the claimed invention may be considered as a waveguide itself. The Examiner also indicates that the line in Figure 1 and Figure 2 is a waveguide which is shown "symbolically above in order to guide the microwave from the magnetron 2 to the treatment waveguide 1." Appellants submit that this is not "...well known in the art of microwave heating devices."

The instant invention can be defined by anyone knowledgeable in the art of microwave drying as a multi-mode oven. Likewise, the Chauffoureaux device would be described as an Axial Traveling Wave Applicator (ATWA). They are different in the manner in which they apply the microwaves to the load. In a multi-mode oven, the waveguide, technically defined as a means to transfer electromagnetic power efficiently from one point in space to another, terminates at the wall of the applicator. The function of the applicator or cavity is to ensure that the power dumped into it by the waveguides is transferred into the load. This is done by being of a size large enough to sustain a number of modes within the frequency range of the magnetron. In Col 2, Lines 17-21, Chauffoureaux specifically states that "The Applicant company has now developed equipment which makes it possible to heat a polar polymer homogeneously by means of microwaves as the polymer travels through a waveguide." This statement is a further indication that the Chauffoureaux device is an ATWA. An ATWA is different from a multi-mode oven in the manner in which it terminates the microwaves into the load. The load passes right through the waveguide, there is no distinguishable boundary between waveguide and applicator. The primary objective is to match the source to the load thereby producing a traveling wave. This applicator is designed for a material with specific dielectric properties, and is susceptible to changes in either the frequency or the load. This type of applicator, as mentioned by Chauffoureaux, is primarily designed to transmit the TE_{11} mode. Conversely, a multi-mode

applicator (such as the instant invention) supports both TE_{mn} and TM_{mn} modes. With a multi-mode oven, it is, as stated by the Examiner, fairly common knowledge to attain even heat distribution in the applicator by introducing multiple microwave feeds (waveguide terminations). On the other hand, with a ATWA, it is the waveguide. It would be extremely hard to prevent cross coupling if multiple sources were used to feed it. One would not look at Chauffoureaux and consider placing multiple sources on one waveguide. If one were to place multiple sources on the treatment section, it would be an electrically separated section from the previous, making not one treatment chamber with multiple feeds, but rather, multiple treatment chambers with one feed each. They instead use malaxating devices to get an even heat distribution, as stated in the patent.

Wear et. al should probably be considered as an example of what is well known in the art of microwave heating devices. This patent at Col 8, Lines 26-54 appears to set out Wear's understanding of the well known art. A microwave generator 114 is connected to three wave guides 116 which lead into the pressure vessel 2. Nowhere does Wear appear to lead to a determination that the treatment area or pressure vessel 2 is a wave guide. There are many indications in Wear that the pressure vessel 2 is not a wave guide and actually indications which teach away from a treatment vessel being a wave guide. For example, claim 1 (and corresponding portions of the specification) indicates that there is a dividing means for "...further isolating each zone from the others in the sense that it prevents microwave radiation from passing from one zone to the next..." Furthermore, each "zone" of Wear includes "...three wave guides 116 which lead through the cylindrical wall 4 of the pressure vessel 2 and terminate at dome-shaped windows 118." It appears highly unlikely that Wear would bother introducing three sets of wave guides and three "windows" to direct the microwaves in three different directions if the pressure vessel itself was considered a wave guide.

The other patent cited by the Examiner, Gerling et. al, also appears to teach against a theory that a treatment vessel is or should be a wave guide. The treatment vessel in Gerling is a "...closed cylindrical microwave transparent tube 90..." (Col. 5, line 44) It appears obvious that a microwave transparent tube can't be a wave guide.

Again, the Examiner asserts that the line in Figures 1 and 2 of Chauffoureaux from the microwave generator to the "...tubular component which acts as a waveguide 1..." (Col. 5, Line

13) must be a wave guide. Appellants admit that this might be a wave guide, but there is no suggestion anywhere in Chauffoureaux that it is a wave guide. It appears to Appellants that if a prior art reference is to be used to reject a patent claim as making that claim obvious from the point of view of the inventor and not using hind sight, the reference should be much clearer than an unlabelled, unreferenced line in a drawing.

At page 9 the Examiner rejects Appellants' argument that it is not reasonable to suggest a combination of Chauffoureaux with Wear because there is no reasonable expectation of success. The device in Chauffoureaux is an extruder. It is common knowledge in the field of the invention that an extruder works by completely filling the "treatment vessel" such that the material may be forced through a die to create a shape. Taking the instant invention as a whole, it is very clear that the instant invention would not work if it operated in the manner in which the Chauffoureaux device operates. That is, the instant invention would not work if the entire volume of the treatment area were filled with material and pushed through a die or similar end device. Again, looking at Chauffoureaux from the point of view of an inventor trying to invent a microwave dryer at the time of the invention, it appears highly unlikely that it would be obvious to a person knowledgeable in the field to modify the Chauffoureaux device to make the dryer. The design and operation of Chauffoureaux simply wouldn't work as a dryer.

Furthermore, the Examiner stated that by looking at Gerling and Chauffoureaux together, it would be obvious to make the units modular or expandable. Appellants disagree based on the fact that with a ATWA, one would not want to make the unit longer, since the power is dissipated in an easily calculated distance once it enters the material flowing in the waveguide. If one expanded the length of the unit, the material close to the microwave source would get hot, and the material further away would get no heat.

In regard to page 10 of the Examiner's Answer, Appellants reassert but won't reiterate their arguments relating to purge gas, a tilting treatment section, and modular construction.

Conclusion

Appellants assert that it would not have been obvious to a person knowledgeable in the field to invent a microwave dryer like the instant invention based upon Chauffoureaux or a combination of Chauffoureaux and Wear and Gerling.

For all of the foregoing reasons, the applicant submits that the microwave dryer disclosed and claimed in the present application is not fairly taught by any of the references of record, taken either alone or in combination.

The Appellants submit that the rejection of claims 1-6, 8, and 9 is in error and should be reversed.


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